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The Structure of Negative Emotions in Adolescents

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This study examined the structure of negative emotions in a sample of nonclinical adolescents, using an approach that exclusively relied on child self-report. A large sample of adolescents ($N = 968$) completed self-report questionnaires measuring symptoms of fear, anxiety, and depression. Confirmatory factor analysis provided support for the notion that fear, anxiety, and depression are distinct yet correlated components of negative emotions. This result is in agreement with recent empirical findings and current theoretical notions on the structure of negative emotions in children and should be taken as an encouragement for researchers to develop more specific measures for assessing fear, anxiety, and depression in children.

KEY WORDS: structure of negative emotions; anxiety; fear; depression; adolescents.

A considerable amount of literature from research in adults provides support for the notion that negative emotions are best understood in terms of separate components. Clark, Watson, and colleagues (Clark & Watson, 1991; Watson, Clark et al., 1995; Watson, Weber et al., 1995) have formulated a tripartite model that clusters symptoms of anxiety and depression into three groups: symptoms of general distress that are largely nonspecific, symptoms of somatic tension and arousal that are relatively unique to anxiety, and symptoms of anhedonia that are specific to depression. Barlow, Chorpita, and Turovsky (1996) formulated an alternative three-factor model, which discriminates the emotions of anxiety, fear, and depression and further details their involvement with underlying brain systems. Briefly, Barlow et al. (1996) suggest a negative affect factor that would be a pure manifestation of the emotion of anxiety, an autonomic arousal factor that would represent fear, and an additional factor unique to depression.

In terms of psychopathological phenomena, anxiety refers to the anxiety disorders that are characterized by tension, apprehension, worry, and general distress arising without any objective source of danger; fear explicitly refers to phobia that is best defined as a negative emotion in relation to a stimulus or situation that is out of proportion to its actual danger; whereas depression refers to mood disorders that are featured by anhedonia and hopelessness (see American Psychiatric Association, 1994).

Studies that have examined the correlations between self-report measures of negative emotions in youths have indicated that there are substantial associations between the factors of negative emotions in this particular population. Illustrative is a study by Dong, Yang, and Ollendick (1994) in which the intercorrelations among measures of fear, anxiety, and depression in a child population were examined. In that study, a relatively low correlation was found between fear and depression ($r = .20$), a moderate correlation was found between fear and anxiety ($r = .38$), and a relatively high correlation emerged between anxiety and depression ($r = .64$). Altogether, these and other findings (see King, Ollendick, & Gullone, 1991) suggest that the three types of negative emotions in children and adolescents are interrelated and that this is particularly true for anxiety and depression. This has led researchers to speculate on the structure of negative emotions in children and adolescents. Some researchers question whether fear, anxiety, and depression are separate constructs at all and suggest that they are all part of one general distress factor (e.g., Finch, Lipovsky, & Casat, 1989; see for a comprehensive review King et al., 1991). Others have put forward the idea that anxiety and depression together

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constitute one factor, whereas fear should be viewed as a distinct type of negative emotion (e.g., Dong et al., 1994). Alternatively, it is also plausible that fear and anxiety being allied states (see Marks, 1987) constitute one factor, with depression being the distinct negative emotion.

Structural equation modeling is a statistical technique that could be useful in providing a detailed picture on the actual structure of negative emotions in children and adolescents. With this approach, it is possible to test plausible models that may underlie a data set. A recent study by Chorpita, Albano, and Barlow (1998) was a first attempt to examine the structure of negative emotions in youths by means of comparative modeling. In that study, a clinical sample of children and adolescents with diagnoses of an anxiety disorder or comorbid anxiety and mood disorders, and their parents were administered measures of childhood fear, anxiety, and depression. By means of structural equation modeling, the following models were tested: (1) a one-factor model with fear, anxiety, and depression items loading on one factor; (2) a two-factor model with fear and anxiety items loading on one factor and depression items loading on the other factor; (3) a two-factor model with anxiety and depression items loading on one factor and fear items loading on the other factor; (4) a three-factor model with fear, anxiety, and depression items loading on three separate factors; and (5) a correlated three-factor model with fear, anxiety, and depression items loading on three correlated factors. Results showed that the fifth model, the model that conceptualized fear, anxiety, and depression as distinct but related factors, provided the best fit for the data.

Although the results of Chorpita et al.'s study (Chorpita et al., 1998) are interesting and fit well with Barlow et al.'s theoretical notions on the structure of negative emotions (Barlow et al., 1996), two issues can be raised that seem to limit the generalizability of these findings. First, Chorpita et al. (1998) relied on a clinical sample of children and adolescents suffering from an anxiety disorder or comorbid anxiety and mood disorders. It remains to be seen whether the correlated three-factor model also emerges in samples of normal children and adolescents. The second issue pertains to the fact that Chorpita et al. used multiple informants for assessing negative emotions in children and adolescents. More specifically, the authors selected fear, anxiety, and depression items from the Child Behavior Checklist (CBCL; Achenbach & Edelbrock, 1983), which measures negative emotions from the parents' point of view, and items of the Revised Children's Manifest Anxiety Scale (RCMAS; Reynolds & Richmond, 1978) and the Children's Depression Inventory (CDI; Kovacs, 1981), which evaluate negative emotions from the child's perspective. It is not clear how this constellation of items from different informants affected the fit of the various models that were tested. Putting it in Chorpita et al.'s words: "An important limitation of our findings was that the correlated error in parent scales and in child scales could not be modeled until three factors were posited." (Chorpita et al., 1998, pp. 82–83)

With these issues in mind, the present study was undertaken. The structure of negative emotions was examined in a sample of nonclinical adolescents, using an approach that exclusively relied on child self-report. A large group of adolescents aged between 12 and 18 years ($N = 968$) completed the Fear Scale for Children (FSC; Muris, 1999), a questionnaire measuring childhood fears; the Spence Children's Anxiety Scale (SCAS; Spence, 1998), an index of anxiety disorders symptoms in children; and the CDI (Kovacs, 1981), a measure of childhood depression. Various models for the structure of negative emotions were examined by means of structural equation/confirmatory factor analysis.

METHOD

Participants and Procedure

One-thousand-and-seventy-three adolescents attending a secondary school in the South-Limburg region of The Netherlands were approached to take part in the study. Eventually, one-thousand-and-nineteen 12- to 18-year-old adolescents (95%) agreed to participate after obtaining informed consent from their parents. Participants completed the set of questionnaires (see later) in their classroom in the presence of the teacher and a research assistant. The questionnaires of 968 adolescents did not contain missing values and were used for the data analysis. This final sample consisted of 496 boys and 472 girls with a mean age of 14.2 years ($SD = 1.4$; range 12–18 years). No exact information about the socioeconomic background, ethnicity, and family structure of the adolescents was available. On the basis of information provided by the staff of the school, the percentages of adolescents with low, middle, and upper socioeconomic background were estimated at 25, 50, and 25%, respectively. The vast majority of the adolescents (more than 90%) was Caucasian, and approximately 7% of the adolescents came from divorced families.

Questionnaires

The FSC is a brief 18-item questionnaire measuring three types of childhood fears, that is, situational–environmental fears, blood–injection–injury fears, and

animal fears. FSC items are scored on a 3-point scale with 1 = *never*, 2 = *sometimes*, and 3 = *often*. The FSC is a new measure and so far little is known about the reliability and validity of this questionnaire. However, recent research by Muris (1999) showed that the scale has good internal consistency ($\alpha = .80$), sufficient test-retest stability (test-retest $r = .75$), and concurrent validity [i.e., FSC scores were positively correlated ($r = .75$) with scores on an alternative measure of childhood fear (the Fear Survey Schedule for Children; Ollendick, 1983)].

The SCAS is a self-report inventory of anxiety disorders symptoms in children and adolescents. The scale contains 38 items that are considered to reflect symptoms of generalized anxiety disorder, separation anxiety disorder, social phobia, panic disorder and agoraphobia, obsessive–compulsive disorder, and specific phobias. SCAS items are rated on 4-point scales: *never*, *sometimes*, *often*, or *always*. These are scored 0, 1, 2, and 3, respectively. The psychometric qualities of the SCAS are satisfactory: the scale has a clear-cut factor structure (i.e., SCAS items generally cluster into categories that correspond with the six above mentioned anxiety disorders; Spence, 1997, 1998), good internal consistency, acceptable test-retest reliability (with a 6-months test-retest correlation of .60; Spence, 1998), and sufficient discriminant and concurrent validity (Spence, 1998; Muris, Schmidt, & Merckelbach, 2000).

The CDI (Kovacs, 1981) is a commonly used self-report questionnaire of depression symptoms in youths 7–17 years of age. The scale has 27 items each consisting of three alternatives of increasing severity. Respondents are asked to choose the statement that best applies to them. Items are scored 0, 1, or 2 with high scores reflecting more severe depression. The CDI has been shown to possess good internal consistency and moderate test-retest stability, to distinguish clinical from nonclinical groups of children and adolescents, and to correlate in a theoretically meaningful way with measures of related constructs such as self-esteem, negative attributional style, and hopelessness (see for a review, Kendall, Cantwell, & Kazdin, 1989).

Statistical Analysis

Confirmatory factor analyses were conducted using the structural equation modeling approach, EQS (Bentler, 1989, 1995). The data were examined with elliptical reestimated least squares (ERLS) estimation using the correlation matrix. ERLS estimation was selected given that tests of normality revealed significant positive skewness and kurtosis among many of the questionnaire items/subscales. This reflected the nature of the problem checklists as the majority of adolescents did not report high levels of symptoms. Estimation methods such as maximum likelihood (ML) that rely on assumptions of normality were therefore considered as inappropriate. Rather, the ERLS estimation method was considered as more preferable as this method to some extent allows nonnormality of the data (Anderson & Gerbing, 1988; Bentler, 1995). In passing, it should be mentioned that results using ML estimation mirrored those produced by ERLS estimation, although the goodness-of-fit indices were somewhat lower.

The most plausible structure of the three questionnaires was investigated by means of confirmatory factor analysis. More specifically, the following models were tested: (a) for the FSC, a three-factor model with situational–environmental fears, animal fears, and blood–injection–injury fears loading on a higher-order factor (see Muris, Schmidt, & Merckelbach, 1999); (b) for the SCAS, a six-factor model with generalized anxiety disorder, separation anxiety disorder, social phobia, panic disorder and agoraphobia, obsessive-compulsive disorder, and specific phobias loading on a higher-order factor (see Spence, 1997, 1998); and (c) for the CDI, a six-factor model with externalizing, dysphoria, self-deprecation, school problems, social problems, and biological dysregulation loading on a higher-order factor (see Craighead, Smucker, Craighead, & Ilardi, 1998).

In imitation of Chorpita et al. (1998), the following models were tested in order to examine the structure of negative emotions: (1) a one-factor model with fear, anxiety, and depression items loading on one factor; (2) a two-factor model with fear and anxiety items loading on one factor and depression items loading on the other factor; (3) a two-factor model with anxiety and depression items loading on one factor and fear items loading on the other factor; (4) a three-factor model with fear, anxiety, and depression items loading on three separate factors; and (5) a correlated three-factor model with fear, anxiety, and depression items loading on three correlated factors. The models were tested by means of second-order factor analysis performed on the correlation matrix of 14 indicators of the three scales (i.e., the 3 FSC factors, the 5 SCAS factors [the specific phobia factor was not included because of overlap with the FSC], and the 6 CDI factors; see supra). This procedure of second-order factor analysis has been recommended by Rindskopf and Rose (1988) for data sets with a large number of low frequency items (as was the case in the current study).

EQS produces a wide range of goodness-of-fit indices: (a) the chi square statistic, which was used to compare the fit of the various model (by means of nested chi square tests), (b) the Root Mean Square Error of Approximation (RMSEA), which should be around .08 or lower, (c) the Adjusted Goodness-of-Fit Index (AGFI),

Table I. Descriptive Statistics (Means, Standard Deviations, and Cronbach's Alphas) and Correlations Among Fear, Anxiety, and Depression Measures

	M (*SD*)					
	Total group	Boys	Girls	α	FSC	SCAS
FSC	23.8 (5.0)	21.9 (3.7)	25.9 (5.4)	.81		
SCAS	12.0 (8.9)	10.2 (7.9)	13.9 (9.7)	.90	.58	
CDI	5.2 (7.3)	4.4 (6.8)	6.0 (7.8)	.83	.31	.60

Note. $N = 968$, 496 boys, 472 girls. CDI = Children's Depression Inventory, FSC = Fear Scale for Children, SCAS = Spence Children's Anxiety Scale. All correlations were significant at $p < .001$.

(d) Comparative Fit Index (CFI), (e) the Nonnormed Fit Index (NNFI), (f) the Incremental Fit Index (IFI), which should all be larger than .90, and (g) Akaike's Information Criterion (AIC), which is a relative measure and the model with the lowest value has the best fit.

RESULTS

General Results

Before addressing the main research question of this study, some general findings are summarized. First, all measures were reliable in terms of internal consistency: for the total sample, Cronbach's alphas were .81 for the FSC, .90 for the SCAS, and .83 for the CDI (see Table I). Second, *t*-tests revealed significant gender differences for all three measures. Girls exhibited higher levels of fear, $t(835.0, \text{adjusted } df) = 13.3$, $p < .001$, anxiety, $t(913.3, \text{adjusted } df) = 11.5$, $p < .001$, and depression, $t(932.4, \text{adjusted } df) = 15.0$, $p < .005$ than did boys. Third, no significant correlations were found between age, on the one hand, and FSC, SCAS, and CDI scores, on the other hand, $r(968)$s were $-.01$, .02, and $-.01$, respectively.

Correlations Between Fear, Anxiety, and Depression

Table I shows Pearson product–moment correlations among the three questionnaires. As can be seen, anxiety (SCAS) was substantially associated with both fear (FSC) and depression (CDI), $r(968)$s being .58, $p < .001$ and .60, $p < .001$, respectively. Furthermore, the correlation between fear (FSC) and depression (CDI) was relatively low, $r(968) = .31$, $p < .001$.

The Structure of the Separate Questionnaires

Confirmatory factor analysis showed that the hypothesized models for the FSC, SCAS, and CDI all provided satisfactory fits of the data. Goodness-of-fit indices were RMSEA = .05, AGFI = .97, CFI = .98, NNFI = .97, and IFI = .98 for the three-factor model of the FSC; RSMEA = .05, AGFI = .93, CFI = .94, NNFI = .93, and IFI = .94 for the six-factor model of the SCAS; and RMSEA = .06, AGFI = .93, CFI = .94, NNFI = .92; and IFI = 0.94 for the six-factor model of the CDI.

The Structure of Negative Emotions

Second-order factor analyses performed on the correlation matrix of 14 indicators (i.e., subscales/factors) of the three scales showed that only the three-correlated-factors model (i.e., Model 5) provided a good fit for the data. All goodness-of-fit indices for this model were satisfactory: RMSEA was < 0.08, AGFI, CFI, NNFI, and IFI were all >0.90, and the AIC value was relatively small (see Table II). Chi square difference tests comparing the fits of various models indicated that the three-correlated-factors model provided a significantly better fit to the data than the other models (all nested chi square tests indicated a significant improvement in fit of Model 5 over the other models).

Table II. Results of Second-Order Factor Analyses Performed on FSC, SCAS, and CDI Indicators[a]

	χ^2	*df*	RMSEA	AGFI	CFI	NNFI	IFI	AIC
Null model	5621.7	91						
Model 1 (single factor)	1202.1	77	.12	.73	.80	.76	.80	1258.1
Model 2 (two factors, depression alone)	582.9	76	.08	.88	.91	.89	.91	640.9
Model 3 (two factors, fear alone)	986.5	76	.11	.77	.84	.80	.84	1044.5
Model 4 (three factors)	864.2	74	.10	.81	.86	.83	.86	907.8
Model 5 (three correlated factors)	387.0	71	.06	.92	.94	.93	.94	448.5

Note. CDI = Children's Depression Inventory, FSC = Fear Scale for Children, SCAS = Spence Children's Anxiety Scale, RMSEA = Root Mean Square Error of Approximation, AGFI = Adjusted Goodness of Fit Index, CFI = Comparative Fit Index, NNFI = Non-Normed Fit Index, IFI = Incremental Fit Index, AIC = Akaike's Information Criterion.
[a] Goodness-of-fit statistics for each model are shown.

Table III. Factor Loadings (Completely Standardized) of the 14 FSC, SCAS, and CDI Indicators on the Three Correlated Factors (Model 5) Obtained With Confirmatory Factor Analysis[a]

	Factor 1 (depression)	Factor 2 (fear)	Factor 3 (anxiety)
CDI			
Dysphoria	.87		
Self-deprecation	.62		
Externalizing	.61		
Biological dysregulation	.59		
Social problems	.56		
School problems	.49		
FSC			
Situational–environmental fears		.72	
Blood–injection–injury fears		.71	
Animal fears		.62	
SCAS			
Generalized anxiety disorder			.83
Panic disorder and agoraphobia			.82
Obsessive–compulsive disorder			.73
Separation anxiety disorder			.71
Social phobia			.71

Note. CDI = Children's Depression Inventory, FSC = Fear Scale for Children, SCAS = Spence Children's Anxiety Scale.
[a]Loadings on nonrelevant factors were set to zero.

Highly similar results were obtained when the models were examined for boys and girls separately. That is, the three-correlated-factors model again provided the best fit for the data. Goodness-of-fit indices of this model were: $\chi^2(71) = 215.6$, RMSEA = .06, AGFI = .92, CFI = .94, NNFI = .93, IFI = .94, and AIC = 277.6 for boys; and $\chi^2(71) = 245.6$, RMSEA = .07, AGFI = .90, CFI = .94, NNFI = .93, IFI = .94, and AIC = 307.6 for girls.

Table III presents standardized factor loadings of the 14 indicators on the three latent factors (i.e., fear, anxiety, and depression) in Model 5. As can be seen, most of the indicators loaded convincingly on their respective factor. The correlations among the three factors in Model 5 were .72 between anxiety and depression, .55 between anxiety and fear, and .38 between fear and depression (all $ps < .001$).

DISCUSSION

This study examined the structure of negative emotions in a group of normal adolescents, using an approach that exclusively relied on child self-report. The results of structural equation/confirmatory factor analyses support the idea that fear, anxiety, and depression are reasonably distinct but are correlated components of negative emotions, a notion that is in keeping with current theories on phobia, anxiety, and depression (e.g., Barlow et al., 1996; King et al., 1991).

As mentioned earlier, a recent factor analytic study by Chorpita et al. (1998) also found that negative emotions in clinically anxious children and adolescents cluster into three separate but correlated components, namely fear, anxiety, and depression. The present study replicates these findings in a non-clinical sample. However, it should be mentioned that although the labels of the three components of negative emotions were identical, the content of these components somewhat differed across both studies. According to Chorpita et al., fear is represented by symptoms of physiological hyperarousal and panic; anxiety by symptoms of tension, worry, apprehension, and general distress; and depression by symptoms of anhedonia and hopelessness. The present study was more guided by the phenomenology of negative emotions as described in the *DSM*. Hence, fear represented the phobic disorders, anxiety represented the anxiety disorders including panic disorder, and depression represented the depressive disorders.

Although the present study provides support for the notion that fear, anxiety, and depression are distinguishable constructs, the findings also point out that it may well be the case that these negative emotions are still part of a higher-order variable. King et al. (1991) mention neuroticism (Eysenck, 1986) and negative affectivity (Watson & Clark, 1984) as most important candidates for this higher-order factor. Interestingly, the pattern of correlations among the three factors of negative emotions that was found in the present study (see also Dong et al., 1994)

resembles the comorbidity figures among phobic, anxiety, and depressive disorders. Research has shown that anxiety and depressive disorders frequently co-occur in children and adolescents (e.g., Costello et al., 1996). The association between phobic disorders, on the one hand, and other anxiety disorders and depression, on the other hand, is less clear (see, for a brief discussion, Costello & Angold, 1995). A recent epidemiological study by Essau, Conradt, and Petermann (in press), however, showed that adolescents with specific phobias frequently suffer from another anxiety disorder and, albeit to a lower degree, depression.

Confirmatory factor analyses confirmed previous empirical findings concerning the factor structure of the fear, anxiety, and depression measures (cf. Craighead et al., 1998; Muris et al., 1999; Spence, 1997, 1998) that were used in the present study. More specifically, for each of the scales a hierarchical model was found to fit the data rather well. This underlines the fact that each of the three constructs of negative emotions (i.e., fear, anxiety, and depression) for their part can be subdivided in several components.

In the past, researchers have often questioned the validity of instruments for measuring fear, anxiety, and depression in children and adolescents. More specifically, questionnaires have been criticized because most of them contain items that tap nonspecific symptoms of childhood psychopathology. As a result, it has been very difficult to establish the boundaries between different types of negative emotions by means of these instruments (see e.g., Lonigan, Carey, & Finch, 1994). For this reason, Chorpita et al. (1998) carried out their analyses on a select number of items of the CBCL, RCMAS, and CDI that were thought to represent one of the three components of negative emotions (i.e., fear, anxiety, or depression). In the discussion of their paper, these authors plead for the development of instruments that tap specific types of negative emotions. It is important to note that such measures are just beginning to emerge. For instance, new scales such as the SCAS, the Multidimensional Anxiety Scale for Children (MASC; March, Parker, Sullivan, Stallings, & Conners, 1997), and the Screen for Child Anxiety Related Emotional Disorders (SCARED; Birmaher et al., 1997) seem to be more pure measures of childhood anxiety than traditional scales such as the RCMAS and Spielberger State-Trait Anxiety Inventory for Children (STAIC; Spielberger, 1973). Another example is the recently developed Revised Child Anxiety and Depression Scale (RCADS; Chorpita, Yim, Moffitt, Umemoto, & Francis, 2000), which attempts to assess symptoms of various *DSM* anxiety disorders as well as major depression.

One limitation of the current study was that it relied on a sample of adolescents and that it remains to be seen whether the present results can be generalized to younger children. A further potential shortcoming pertains to the measurement method that was employed in the current study. More specifically, the constructs of anxiety, fear, and depression were assessed with separate questionnaires that were somewhat different in format and the number of response items (e.g., the SCAS has 4-point rating scales whereas the CDI and the FSC use 3-point scales). Thus, the possibility cannot be ruled out that some of the convergence/divergence observed within or between the constructs is a result of systematic measurement error. Nevertheless, the present findings are in keeping with those obtained by Chorpita et al. (1998) and provide further support for the tripartite model of negative emotions in youths. As such the results should be taken as encouragement for those researchers who aim at developing valid, reliable, and (more) specific measures of childhood fear, anxiety, and depression.

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